

REMARKS

Claims 7-17 remain in the application and are presented for examination and reconsideration. Claims 18-31 have been withdrawn from consideration. Claim 7 has been amended, in the manner discussed during the interview on March 5, 2003, by insertion of a negative limitation, to more clearly define the claimed invention. The Examiners are thanked for the courtesy of the interview granted on March 5, 2003, and the contents of the interview are reflected herein.

As the Examiners are aware, the Manual of Patent Examining Procedure at section 2173.05 (i) indicates that, "there is nothing inherently ambiguous or uncertain about a negative limitation." The MPEP requires that the boundaries of the patent protection be set forth definitely, albeit negatively, and that the negative limitation have basis in the original disclosure. Attention is called, in the MPEP section, to the decision of *In re Wakefield*, as representative of the current view of the courts on the permissible use of negative limitations in defining a claimed invention that complies with the requirement of 35 U.S.C. §112.

In the present application, Claim 7 has been amended by inserting a negative limitation to further define the claimed invention. Support for the negative limitation amendment to Claim 7 is found in the originally filed specification, at page 4, line 29.

REJECTION UNDER 35 U.S.C. §103(a)

The Examiner has rejected Claims 7-17, under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,983,304 to Tsugita et al. (hereinafter the '304 patent) in view of U.S. Patent No. 5,905,035 to Okada et al. (hereinafter the '035 patent). Applicants respectfully traverse this rejection for the following reasons.

THE '304 PATENT IS DIRECTED TO A SPECIFIC MEMBRANE

The '304 patent is directed to a claimed separation membrane that is a specific separation membrane for separating a water-alcohol mixed liquid by the pervaporation method. As stated at column 2, lines 25-56, the separation membrane, that is the primary object of the invention of the '304 patent, is composed of a chitosan derived from a shell of prawn or shrimp having a molecular weight of 80,000 to 150,000, and a deacetylation degree of 80 to 95%.

In discussing the attempt to utilize chitosan as a material for a membrane to separate a water-alcohol mixed liquid, at column 3, lines 26-53, of the '304 patent, it is pointed out that the prior known techniques were not successful, and it is stated that the process of the '304 patent was successful in solving the problems of the prior known techniques (see column 3, lines 54-68 of the '304 patent).

More particularly, the solution to the problem, as shown at column 3, lines 54-68, of the '304 patent, entails utilizing as the material for the separation membrane, a chitosan, obtained from a shell of prawn or shrimp, that has a molecular weight of 80,000 to 150,000, and a deacetylation degree of 80 to 95%. According to the '304 patent, use of this specific chitosan as the separation membrane in the separation of a water-alcohol mixed liquid by the pervaporation method, results in an especially high separation coefficient, and a selective water permeability of almost 100%, at an ethanol concentration higher than 50% by weight.

In further defining the invention of the '304 patent, at column 4, lines 1-31, it is stated clearly that it is indispensable (emphasis added) that the separation membrane be prepared from a chitosan having a molecular weight of 80,000 to 150,000, and a deacetylation degree of 80 to 95%. The '304 patent comments, at column 4, lines 6-9, that "if any one of these conditions is not satisfied, an intended membrane having a high separation coefficient and a high mechanical strength cannot be obtained." Elaborating on this statement, the '304 patent, at column 4, lines 21-31, points out that use of chitosan having a deacetylation degree lower than 80%, or higher than 95%, will not yield a suitable separation member.

Applicants direct the Examiner's attention to the statement at column 3, lines 67-68, of the '304 patent, that the invention of the '304 patent is based on a specific finding, namely the use as a separation membrane, for separating a water-alcohol mixed liquid by the pervaporation method, of a chitosan obtained from a shell of prawn or shrimp, that has a molecular weight of 80,000 to 150,000 and a deacetylation degree of 80 to 95%.

THE '304 PATENT MENTIONS FUNGUS

The Applicants note that the '304 patent discloses only once that chitin constitutes the supporting tissue of a crustacean such as a crab, a prawn or a shrimp, or a fungus (see column 3, lines 1-3). However, Applicants contend this sole mention of chitin being obtained from fungus is merely intended to be descriptive of well known information, and is not intended to be considered as a facet of the invention of the '304 patent. Rather, Applicants contend that a fair and reasonable representation of the invention of the '304 patent is that stated at column 3, lines 54-68, by the patentee. This requires a finding that use of a particular chitosan obtained from a shell of a prawn or a shrimp results in preparing a suitable separation membrane intended specifically for the separation of a water-alcohol mixed liquid by the pervaporation method.



THE '304 PATENT DOES NOT OVERCOME THE DEFICIENCIES OF THE '035 PATENT

The '304 patent does not disclose the present claimed invention, and, accordingly, the Examiner has attempted to overcome the deficiencies of the '304 patent by combining the '035 patent. However, Applicants contend that the '035 patent fails to overcome the deficiencies of the '304 patent.

In more detail, the '035 patent relates to a specified fungus that is usable for the production of chitin.

THE BACKGROUND SECTION OF THE '035 PATENT INDICATES THAT THE FOLLOWING IS
WELL-KNOWN IN THE ART

As part of the information indicated as being well known by the background section of the '035 patent are the following. According to the '035 patents, chitin is obtained from crustacean shells, insect exoskeletons, fungal cell walls, microfauna and plankton. It is also stated that chitin from fungi provides a purer and more consistent chitosan than that obtained from shellfish. Further, the '035 patent states that chitin and chitosan are used in separations, among many other applications. All of this information was well known and forms no part of the claimed invention of the '035 patent that claims a specific fungus that is useful in producing chitin.

Furthermore, none of the background information of the '035 patent would result in a reason that one of ordinary skill in the art would consider the '035 patent if seeking to modify the '304 patent to render obvious the presently claimed invention. The sole description in the '035 patent relating to degree of deacetylation is shown, at column 1, lines 32-34, where it is stated that, "generally, about 80% of the chitosan polysaccharide units are deacetylated and 20% remain acetylated." Considering that the '304 patent requires the use of a specific chitosan for preparing a specific separation membrane for carrying out a specific separation of water-alcohol mixed liquid by the pervaporation method, Applicants contend that there is no motivation to combine teachings of the '035 patent. In particular, the '304 patent specifies that it is critical to utilize a chitosan having a deacetylation degree of 80 to 95%, in preparing a suitable separation membrane. By contrast, the '035 patent merely discloses that it is well known that generally about 80% of the chitosan polysaccharide units are deacetylated. There is certainly no disclosure or suggestion, in the '035 patent regarding a chitosan that has a deacetylation degree falling within a range of 80 to 95%, said to be critical in the '304 patent. In view of the above, Applicants contend there is no motivation that would have resulted in one of ordinary skill in the art combining the teachings of the '304 patent and the '035 patent.

Additionally, Claim 6 describes a chitosan from fungus that is greater than 95% deacetylated. Neither the '304 patent nor the '035 patent teach or suggest a chitosan from fungus that is greater than 95% deacetylated. Moreover, the '304 patent clearly states that chitosan that is greater than 95% deacetylated is not useful in the membrane technology described. Thus, the '304 patent teaches away from Applicants' claimed chitosan with greater than 95% deacetylation and therefore, claim 6 is clearly allowable.

Therefore, Applicants contend that claims 7-17 are patentable. Accordingly, Applicants respectfully request the Examiner to withdraw the rejection of claims 7-17, under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,983,304 in view of U.S. Patent No. 5,905,035.

CLARIFICATION

In the Examiner's Response to Arguments section of the present Office Action, there is an incorrect statement by the Examiner. In particular, the Examiner stated that Applicants asserted that U.S. Patent No. 4,983,304 to Tsugita et al., "does not teach chitosan greater than 85% deacetylated." This was not stated by Applicants. Rather, the Applicants correctly stated the Tsugita et al. patent does not teach chitosan derived from fungus that is greater than 85% deacetylated. The purpose of this clarification is merely to correct the record in the present application.

CONCLUSION

Applicants believe the application is in condition for allowance. Accordingly, in view of the foregoing amendments and remarks, the Examiner is respectfully requested to withdraw the rejection of claims 7-17. Applicants submit that claims 7-17 are patentable, and respectfully request the Examiner to pass the application to issue.



VERSION WITH MARKINGS TO SHOW CHANGES MADE

7. (Amended) A chitosan containing material derived from fungal biomass, the chitosan containing material having:

greater than 85 percent deacetylation of N-acetyl groups in the chitin and
not including material from phyto-plankton, crustaceans, or mollusks.

Respectfully submitted,

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